ANSI Z359 Overview
George Stallings-Sales Solutions

March 15, 2018
PRESENTATION OVERVIEW

• Key Fall Statistics
• Brief Overview of What ANSI Is
• Overview of the ANSI Z359 Standards
• In Depth Look at Selected Standards
  • Z359.7 (Qualification and Verification Testing)
  • Z359.11 (Full Body Harnesses)
  • Z359.13 (Energy Absorbing Lanyards)
  • Z359.14 (SRDs)
  • Z359.18 (Anchors)
• Walkthrough Example Accreditation Certificates
• Walkthrough Example Declaration of Conformity (D.O.C.)
• Walkthrough Example Test Report
• Q & A
Key Fall Statistics

- Total Fall Fatalities 849
- 697 Falls to Lower Level
- 152 from Same Working Surface
- 388 in Construction (362 in 2015)
- 309 in General Industry
- 47% of all Falls to a Lower Level, were from 15’ or less
## ANSI Class A SRD

### Fig. 3 - Minimum Clear Fall Requirement: ANSI Class A Self-Retracting Device

<table>
<thead>
<tr>
<th></th>
<th></th>
<th><strong>Activation/Deceleration Distance</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>2 ft</td>
<td>Maximum allowable length of cable or web that may payout from the SRD once deceleration of the user has begun and after a fall event occurs</td>
</tr>
<tr>
<td>B</td>
<td>1 ft</td>
<td><strong>Harness Stretch and Dorsal D-Ring Shift</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Combined amount of harness webbing elongation and dorsal D-ring upshift during entire fall event</td>
</tr>
<tr>
<td>C</td>
<td>1½ ft</td>
<td><strong>Safety Factor</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Added length to account for other factors such as an improperly adjusted harness, actual worker height or worker weight</td>
</tr>
<tr>
<td>D</td>
<td>4½ ft</td>
<td><strong>Total Minimum Clear Fall Distance Required</strong></td>
</tr>
</tbody>
</table>

1. Overhead Anchorage  
2. Walking/Working Surface  
3. Nearest Lower Level or Obstruction
# ANSI Class B SRD

## Fig. 4 - Minimum Clear Fall Requirement: ANSI Class B Self-Retracting Device

<table>
<thead>
<tr>
<th></th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>4½ ft Activation/Deceleration Distance</td>
</tr>
<tr>
<td></td>
<td>Maximum allowable length of cable or web that may payout from the SRD once</td>
</tr>
<tr>
<td></td>
<td>deceleration of the user has begun and after a fall event occurs</td>
</tr>
<tr>
<td>B</td>
<td>1 ft Harness Stretch and Dorsal D-Ring Shift</td>
</tr>
<tr>
<td></td>
<td>Combined amount of harness webbing elongation and dorsal D-ring up-shift</td>
</tr>
<tr>
<td></td>
<td>during entire fall event</td>
</tr>
<tr>
<td>C</td>
<td>1½ ft Safety Factor</td>
</tr>
<tr>
<td></td>
<td>Added length to account for other factors such as an improperly adjusted</td>
</tr>
<tr>
<td></td>
<td>harness, actual worker height or worker weight</td>
</tr>
<tr>
<td>D</td>
<td>7 ft Total Minimum Clear Fall Distance Required</td>
</tr>
</tbody>
</table>

1. Overhead Anchorage  
2. Walking/Working Surface  
3. Nearest Lower Level or Obstruction
WHAT IS ANSI Z359?

1. WHAT IS ANSI?
   The American National Standards Institute (ANSI) is a voluntary, non-profit organization that oversees the development of voluntary national standards in the United States.

2. WHAT IS THE PURPOSE OF THE ANSI Z359 STANDARDS?
   Together with ANSI (American National Standards Institute), the ANSI Z359 Fall Protection Code was designed to provide a basis for fall protection equipment in the United States. In February 2013, OSHA announced that its new standard would be based on the original ANSI Z359. The Z359 standard consists of a wide variety of standards, each covering a different aspect of fall protection, including design, testing, marking, labeling, and use of personal fall arrest systems.

3. ARE THESE STANDARDS MANDATORY OR VOLUNTARY?
   There are a number of standards developed by ANSI that are not legally enforceable, meaning they are not codified as laws. However, those that are legally enforceable can carry the force of law.
   - OSHA Adoption/Direct Citation
   - Implicit Regulation
   - General Duty Clause
   - No enforcing body
   - “Buyer beware”

August 14th, 2017 Transition Recap

- Consensus standard developed by industry experts, safety professionals, end users, and manufacturers
- Voluntary compliance, but can carry the force of law
  - OSHA Adoption/Direct Citation
  - Implicit Regulation
  - General Duty Clause
- No enforcing body
- “Buyer beware”
LIST OF CURRENT ANSI Z359 STANDARDS

• Z359.0-2012: Definitions & Nomenclature Used for Fall Protection/Arrest
• Z359.1-2016: The Fall Protection Code
• Z359.2-2017: Minimum Requirements for a Comprehensive Managed Fall Protection Program
• Z359.3-2017: Lanyards & Positioning Lanyards
• Z359.4-2013: Safety Requirements for Assisted/Self-Rescue Systems, Subsystems, & Components
• Z359.6-2016: Specifications and Design requirements for Active Fall Protection Systems
• Z359.7-2011: Qualification & Verification Testing of Fall Protection Products
• Z359.11-2014: Safety Requirements for Full Body Harnesses
• Z359.12-2009: Connecting Components for Personal Fall Arrest Systems (PFAS)
• Z359.13-2013: Personal Energy Absorbers and Energy Absorbing Lanyards
• Z359.14-2014: Safety Requirements for SRDs for PFAS & Rescue
• Z359.15-2014: Safety Requirements for Single Anchor Lifelines and Fall Arresters for PFAS
• Z359.16-2016: Safety Requirements for Climbing Ladder Fall Arrest Systems
• Z359.18-2017: Safety Requirements for Anchorage Connectors

Note: There are unreleased standards that are currently under development by the committee, which include: HLLs, Rope Access Systems, Descent Devices, and Rigid Rail Systems.
Key Takeaways

- All testing must be done in an ISO:17025 accredited lab
- Testing labs shall only test to the latest standards
- All testing done in manufacturer’s lab must be witnessed by a third-party lab representative or a professional engineer
- No compliance claims to portions of product standard (all or nothing)
- Three test specimens per test, unless otherwise specified
- Manufacturer’s must produce test reports upon request
- If manufacturer is not ISO:9001 accredited, they must recertify every two years.
Required Tests
- Static Pull Test (4.3.5)
- Dynamic Feet First Drop Test (4.3.3)
- Dynamic Head First Drop Test (4.3.4)
- Impact Indicator Test (4.3.6)

Design Requirements
- Sub-Pelvic Strap (the most important one) (3.1.2)
- Dorsal D-Ring (3.1.3)
- Back Strap (3.1.4)
- Lanyard Keepers (120 lbs. release) (3.1.10)
- Others for harnesses with more attachment points, features, etc.

Trauma Relief Straps
 Required Tests
• Static Strength Test (4.6/4.7)
• 6’ FF and 12’ FF Dynamic Drop Tests (4.5/4.8)
• Y-Leg Dual Connection Drop Test (4.9/4.10)
• Wraparound Static Test (4.11)
• Wraparound Abrasion Test (4.12)
• Conditioned Testing (4.13)

Design Requirements
• 6’ FF vs. 12’ FF classification
• Lanyard construction requirements
• Labeling requirements include classification, forces, and arrest distance
Required Tests
- Static Strength Test
- Dynamic Strength Test
- Residual Dynamic Strength Test
- Salt Spray Corrosion Test

Design Requirements
- 3 types of Anchorage Connectors:
  - Type T = Tieback
  - Type D = Deforming
  - Type A = Everything Else
- Testing requirements are slightly different for each style
- All welds must be AWS/ANSI qualified
- Previous requirements were in Z359.1-2007
  - 5000 lbs. Static Strength Test only
Required Tests

- Static Strength Test (4.2.5)
- Dynamic Strength Test (4.2.3)
- Dynamic Performance Tests (4.2.1)
- SRL-LE Dynamic Drop Tests (4.2.2/4.2.4)
- Retraction Testing (4.2.6)
- Conditioned Testing (4.2.8)
- SRL-R (3-Way) Testing (4.3)

Class A vs. Class B

- Class A: 24” maximum arrest distance (higher forces allowed)
- Class B: 54” maximum arrest distance (lower forces allowed than Class A)
- OVERHEAD ONLY; classification is meaningless for below D-ring tieoff
ANSI Z359.14-2014 (SRL-LE): IN-DEPTH LOOK

Required SRL-LE Tests
- Dynamic Drop Tests over the Edge (Perpendicular and Lateral Offset) (4.2.2)
- Dynamic Strength Test over the Edge (4.2.4)
- Conditioned Testing (4.2.8)

Key Points
- Z359.14-2014 requires that all SRL-LE testing is done over a 0.005” radius edge
- Z359.14-2012 does not have this requirement!
- SRL-LE’s must have an energy absorbing component that connects to the user

FallTech White Paper on Z359.14 SRL-LE
CERTIFICATE OF REGISTRATION

This is to certify that the Quality Management System of

Alexander Andrew, Inc. (FallTech)
1306 S. Alameda Street
Compton, CA 90221
USA

has been assessed by TRC, Inc. and found to be in conformance to the following standard(s):

ISO 9001:2008

This Registration is for the following scope:
Design, manufacture and service of fall protection equipment.

Original Issue Date: September 28, 2015
Current Term Issue Date: August 30, 2016
Expiry Date: September 15, 2018

Certificate Number: TRC 00969
1400 Preston Road, Suite 400, Plano, TX 75093 USA
333 Laird Road, Unit 5, Guelph, ON N1G 4P7 CANADA

President, The Registrar Company, Inc.
International Accreditation Service

CERTIFICATE OF ACCREDITATION

This is to signify that

ALEXANDER ANDREW INC. DBA FALLTECH
1306 SOUTH ALAMEDA STREET
COMPTON, CALIFORNIA 90221

Testing Laboratory TL-594

has met the requirements of the IAS Accreditation Criteria for Testing Laboratories (AC89), has demonstrated compliance with ISO/IEC Standard 17025:2005, General requirements for the competence of testing and calibration laboratories, and has been accredited, commencing December 10, 2015, for the test methods listed in the approved scope of accreditation.

Patrick V. McCullen
Vice President, Chief Technical Officer

C. P. Ramani, P.E.
President

Print Date: 12/17/2015

This accreditation certificate supersedes any IAS accreditation certificate bearing an earlier date. The certificate becomes invalid upon suspension, cancellation or revocation of accreditation. See the IAS Accreditation Listings on the web at www.isasonline.org for current accreditation information, or contact IAS directly at (562) 364-8201.
This is not a required document per the ANSI standards, but a higher degree of transparency that FallTech offers its customers. We even include our test reports with the D.O.C.

What to Look For

- Applicable product numbers
- ANSI Standard callout
- Test Reports cited match Test Reports for the product in question

Future Note: The latest draft of Z359.7-2011 requires that all manufacturers provide a D.O.C. as well as the test reports upon request. Projected 2018 approval with 2019 effectivity
Test Report Requirements per Z359.7

- Title/Date
- Manufacturer’s Name
- Products Tested
- ISO accreditation of lab
- Location of testing
- Applicable standards
- Signatures of authorizing personnel
- Testing results and comments
- Testing conditions (temp, etc.)
- All relevant testing information (test mass, data collection equipment, etc.)
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Questions?
Thank you!